



SGS-THOMSON
MICROELECTRONICS

MJ10004/4P/4PFI
MJ10005/5P/5PFI

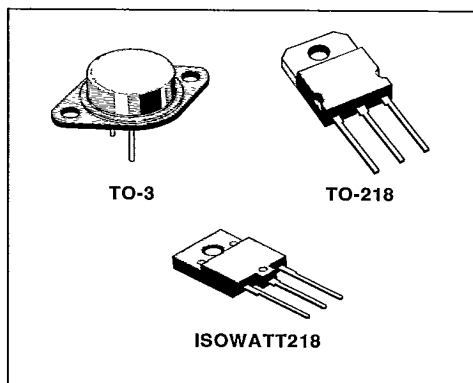
S G S-THOMSON

30E D
EPITAXIAL PLANAR NPN**DESCRIPTION**

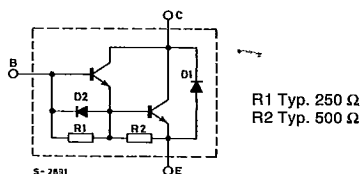
The MJ10004/5, MJ10004P/5P and MJ10004PFI/5PFI are silicon epitaxial planar NPN transistors in monolithic Darlington configuration with integrated speed-up diode.

They are mounted respectively in TO-3 metal case, TO-218 plastic package and ISOWATT218 fully isolated package.

They are designed for high power, fast switching applications.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	MJ10004/4P/4PFI		MJ10005/5P/5PFI		Unit	
V _{CEX}	Collector-emitter Voltage (V _{BE} = − 5V)	350		400		V	
V _{CEV}	Collector-emitter Voltage (V _{BE} = 1.5V)	400		450		V	
V _{GEO}	Collector-emitter Voltage (I _B = 0)	450		500		V	
V _{EBO}	Emitter-base Voltage (I _C = 0)	8				V	
I _C	Collector Current	20				A	
I _{CM}	Collector Peak Current	30				A	
I _B	Base Current	2.5				A	
I _{BM}	Base Peak Current	5				A	
		TO-3		TO-218		ISOWATT218	
P _{tot}	Total Power Dissipation at T _c ≤ 25°C	175		125		60	W
T _{stg}	Storage Temperature	− 65 to 200		− 65 to 150		− 65 to 150	°C
T _j	Max. Operating Junction Temperature	200		150		150	°C

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THERMAL DATA

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			TO-3	TO-218	ISOWATT218	
$R_{th j-case}$	Thermal Resistance Junction-case	Max	1	1	2.08	$^{\circ}C/W$

T-33-29

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cutoff Current ($R_{BE} = 50\Omega$)	$V_{CE} = \text{Rated } V_{CEV}$ $T_{case} = 100^{\circ}C$			5	mA
I_{CEV}	Collector Cutoff Current ($V_{BE} = 1.5V$)	$V_{CEV} = \text{Rated Value}$ $V_{CEV} = \text{Rated Value}$ $T_{case} = 150^{\circ}C$			0.25	mA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 2V$			175	mA
$V_{CEO(sus)}^*$	Collector-emitter Sustaining Voltage ($I_B = 0$)	$I_C = 250mA$ $V_{clamp} = \text{Rated } V_{CEO}$ for MJ10004/4P/4PFI for MJ10005/5P/4PFI	350 400			V V
$V_{CEX(sus)}^*$	Collector-emitter Sustaining Voltage ($V_{BE} = -5V$)	$I_C = 2A$ $V_{clamp} = \text{Rated } V_{CEX}$ $T_{case} = 100^{\circ}C$ for MJ10004/4P/4PFI for MJ10005/5P/5PFI $I_C = 10A$ $T_{case} = 100^{\circ}C$ $V_{clamp} = \text{Rated } V_{CEX}$ for MJ10004/4P/4PFI for MJ10005/5P/5PFI	400 450 275 325			V V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 10A$ $I_B = 400mA$ $I_C = 20A$ $I_B = 2A$ $I_C = 10A$ $I_B = 400mA$ $T_{case} = 100^{\circ}C$			1.9 3 2.5	V V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10A$ $I_B = 400mA$ $I_C = 10A$ $I_B = 400mA$ $T_{case} = 100^{\circ}C$			2.5 2.5	V V
h_{FE}^*	DC Current Gain	$I_C = 5A$ $V_{CE} = 5V$ $I_C = 10A$ $V_{CE} = 5V$	50 40		600 400	
V_F^*	Diode Forward Voltage	$I_F = 10A$		1.8	5	V
h_{fo}	Small-signal Current Gain	$I_C = 1A$ $V_{CE} = 10V$ $f = 1MHz$	10			
C_{ob}	Output Capacitance	$V_{CB} = 10V$ $I_E = 0$ $f = 100MHz$	100		325	pF
t_{on}	Turn-on Time	$V_{CC} = 250V$ $I_C = 10A$ $I_{B1} = -I_{B2} = 400mA$		0.5	0.8	μs
t_s	Storage Time	$V_{BE(off)} = 5V$		1	1.5	μs
t_f	Fall Time	$t_p = 50\mu s$ Duty Cycle - 2%		0.3	0.5	μs